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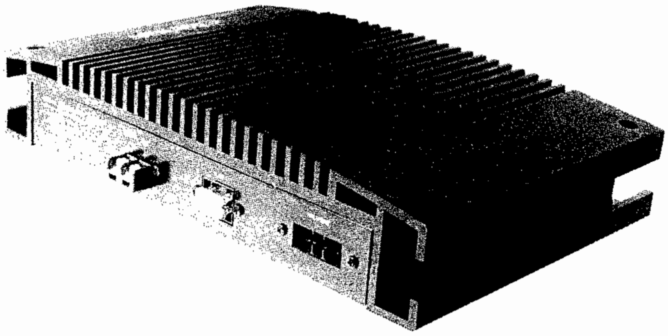
clarion Service Manual

Published by Service Administration Section

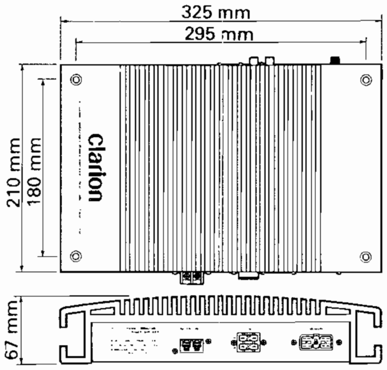


80W(PEAK)×4 Channel Bridgeable Power Amplifier

Model 504HA(EE-723B)

■ SPECIFICATIONS:

Circuit System:	High Stability Pulse Width Modulated DC to DC Switching Mode Power Supply+4 Power units Parallel push-pull complementary circuit.
Rated Power:	40 W×4 (1 kHz, 0.1% 4Ω)
Max. Power:	80 W (PEAK)×4
Frequency Response:	10 Hz to 60 kHz(−1 dB)
Speaker Impedance:	4Ω×4
Rated Voltage:	14.4 V (10.8 to 15.6 V) with negative ground
Current Consumption:	30 A (at Full Output)
Weight:	4.2 kg
Dimensions:	



■ COMPONENTS:

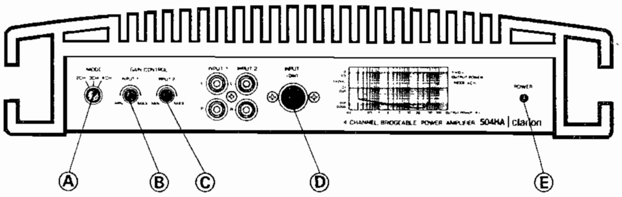
- **EE-723B-01**

Main unit		1
Lead holder	335-0833-01	4
Tap-screw	700-5030-19	4
Plate nut	725-0181-00	4
Battery cord	653-0122-05	1
9P connector	653-0122-04	1
Ground cord	653-0122-06	1

■ FEATURES:

- TOTAL maximum output power 80W (PEAK)×4
- Maximum output power 50W×4 (at 1kHz, 10% THD)
- Continuous power output 160W (40W×4, into 4 ohms, 20Hz to 20kHz, at 0.1% THD)
- Bridgeable for 2, 3 or 4 channel mode operation
- High stability pulse width modulated DC to DC switching mode power supply
- Ground-loop isolation input circuit
- 2 ohms load capability
- Two adjustable input level controls
- Overvoltage protection circuit
- Overheating protection circuit
- Speaker lead short protection circuit
- Turn-On muting circuit (soft start)
- Low AM radio frequency interference

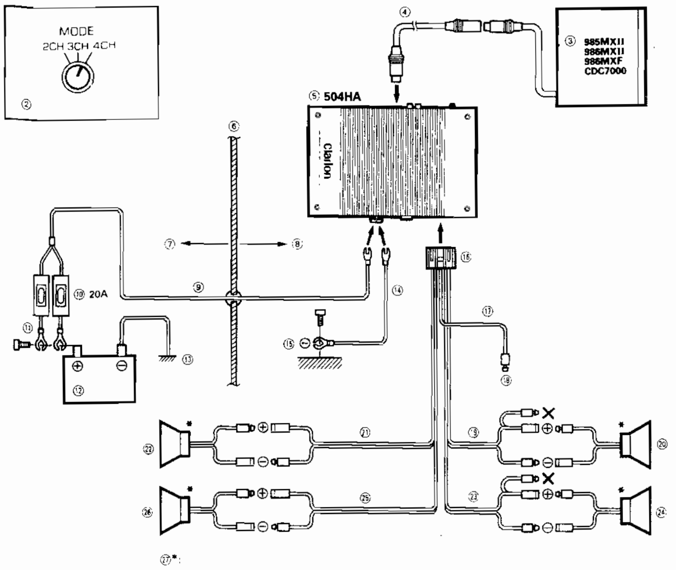
■ OPERATION:



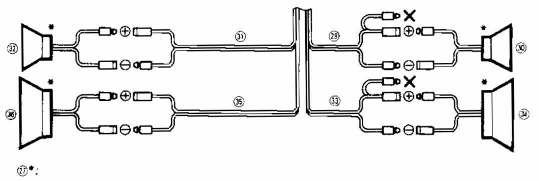
Ⓐ **MODES SELECTOR:** Set the mode selector to the desired mode.
Ⓑ **INPUT 1 LEVEL CONTROL:** This adjusts the input level of the speakers connected to the OUTPUT 1 jacks when the mode selector is set at the 4CH or 3CH mode.
Ⓒ **INPUT 2 LEVEL CONTROL:** This adjusts the input level of the speakers connected to the OUTPUT 2 jacks when the mode selector is set at the 4CH, 3CH or 2CH mode.
Ⓓ **DIN INPUT** .
Ⓔ **POWER INDICATOR**

■ WIRE CONNECTION:

①
■ 4-SPEAKER INSTALLATION POWER/GROUND LEADS

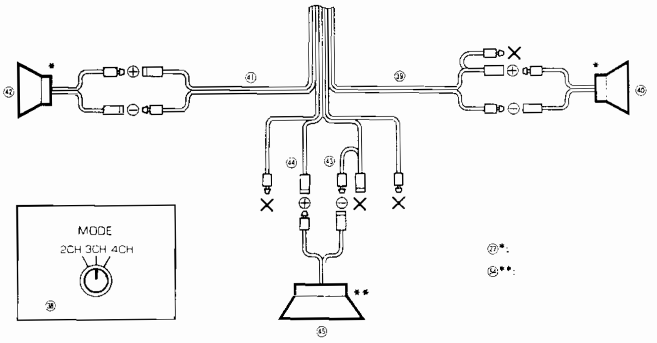


㉘
• SPEAKER CONNECTIONS WHEN USING WITH THE 20EX ELECTRONIC CROSSOVER OR 900EX ELECTRONIC EQUALIZER WITH SURROUND

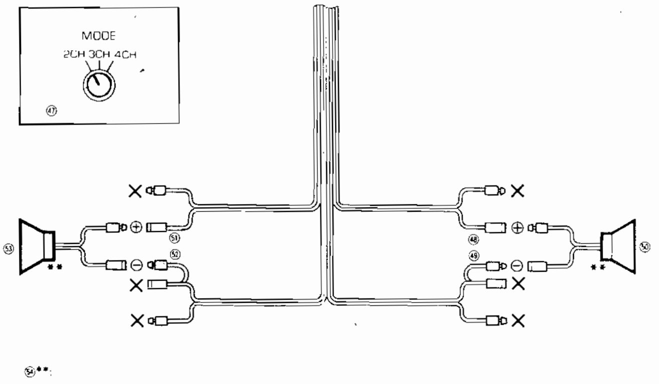


㊲
■ 3-SPEAKER INSTALLATION/INSTALLATION A 3 HAUT-PARLEURS

(Use these connections when playing the woofer in monaural using in combination with the 20EX Electronic Crossover or 900EX Electronic Equalizer with Surround)



㊻
■ 2-SPEAKER INSTALLATION



① **■ 4-SPEAKER INSTALLATION POWER/GROUND LEADS**

② **MODE Selector**
The Mode selector must be switched to 4CH mode.

③ **Model with Line Out or 985MXII, 986MXII, 986MXF or CDC7000**

④ **Connecting Cord. CCA-169-100 or CCA-170-100**

⑤ **4 Channel Bridgeable Power Amplifier 504HA**

⑥ **Dashboard (metal sheet)**

⑦ Engine side

⑧ Internal side

⑨ Red wire

⑩ **Fuse(20A)**

⑪ Main Power Supply

⑫ **12V Battery**

⑬ **Car Ground**

⑭ Black wire

⑮ **Ground** ⊖ (Connect to vehicle's metal chassis)

⑯ **9P Connector**

⑰ Blue/White wire

⑱ **Amplifier Control Lead**
Connect to terminal of the Remote Switching Lead of the head unit. Amplifier control lead is connected in case RCA Line level input used.

⑲ ⊕: Gray, ⊖: Gray/Black wire

⑳ **Output 1-Right (Front-Right Speaker)**

㉑ ⊕: White, ⊖: White/Black wire

㉒ **Output 1-Left (Front-Left Speaker)**

㉓ ⊕: Gray/Green, ⊖: Gray/Red

㉔ **Output 2-Right (Rear-Right Speaker)**

㉕ ⊕: White/Green, ⊖: White/Red wire

㉖ **Output 2-Left (Rear-Left Speaker)**

㉗ *: Use 4 ohms impedance speakers with maximum wattage rating of more than 80 watts.

㉘ **• SPEAKER CONNECTIONS WHEN USING WITH THE 20EX ELECTRONIC CROSSOVER OR 900EX ELECTRONIC EQUALIZER WITH SURROUND**

㉙ ⊕: Gray; ⊖: Gray/Black wire

㉚ **Output 1-Right (Mid Range/Tweeter-Right)**

㉛ ⊕: White, ⊖: White/Black wire

㉜ **Output 1-Left (Mid Range/Tweeter-Left)**

㉝ ⊕: Gray/Green, ⊖: Gray/Red wire

㉞ **Output 2-Right (Woofer - Right)**

㉟ ⊕: White/Green, ⊖: White/Red wire

㊱ **Output 2-Left (Woofer - Left)**

㊲ **■ 3-SPEAKER INSTALLATION**
(Use these connections when playing the woofer in monaural using in combination with the 20EX Electronic Crossover or 900EX Electronic Equalizer with Surround)

㊳ **MODE SELECTOR**
The mode selector must be switched to 3CH mode

㊴ ⊕: Gray, ⊖: Gray/Black wire

㊵ **Output 1-Right (Mid Range/Tweeter-Right)**

㊶ ⊕: White, ⊖: White/Black wire

㊷ **Output 1-Left (Mid Range/Tweeter-Left)**

㊸ ⊖: Gray/Green wire

㊹ ⊕: White/Green wire

㊺ **Output 2-Mono (Woofer)**

㊻ **■ 2-SPEAKER INSTALLATION**

㊼ **MODE SELECTOR**
The mode selector must be switched to 2CH mode

㊽ ⊕: White/Green wire

㊾ ⊖: Gray/Green wire

㊿ **Output 2-Right (Right Speaker)**

(51) ⊕: White wire

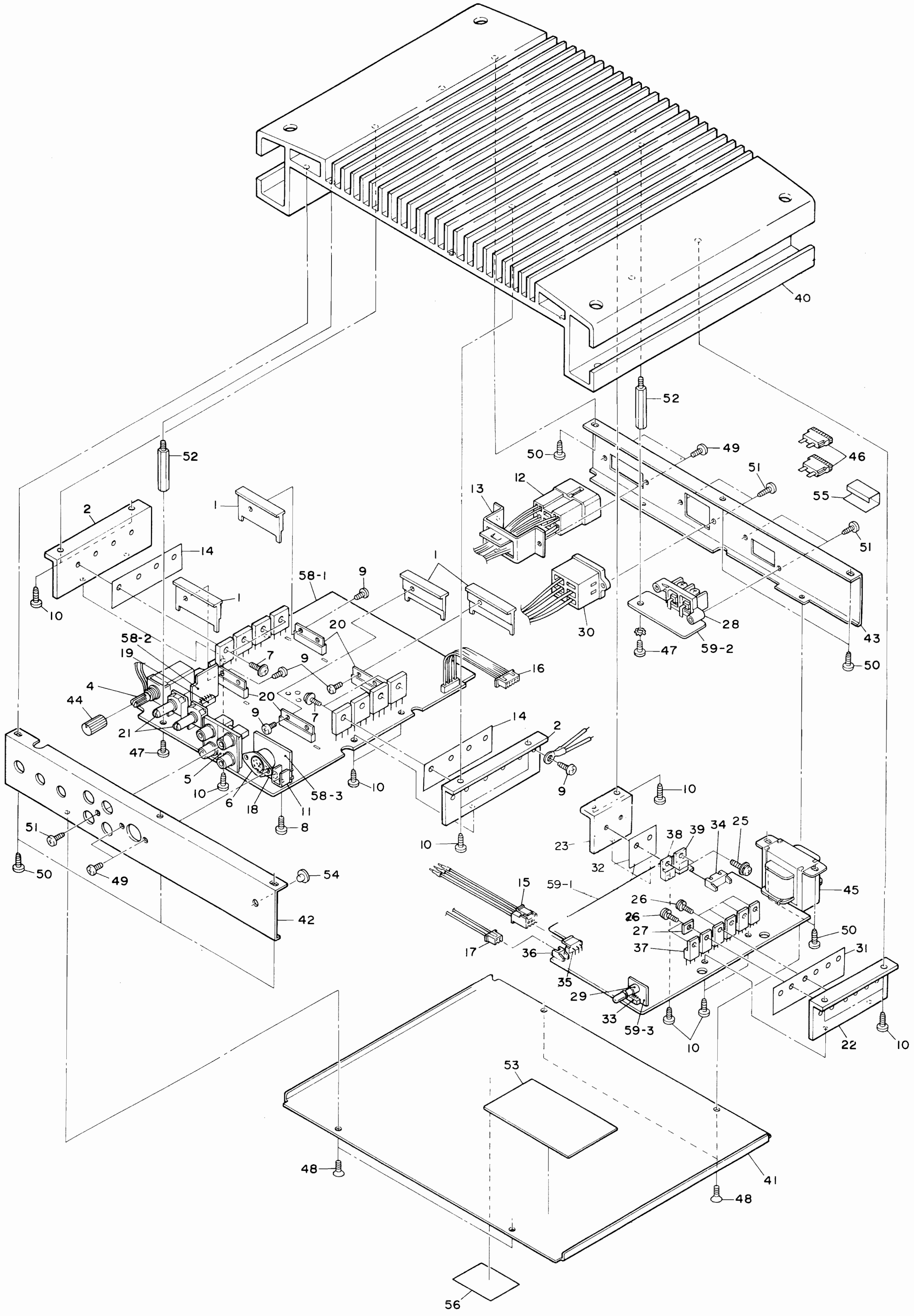
(52) ⊖: Gray wire

(53) **Output 2-Left (Left Speaker)**

(54) **: Use 4 ohms impedance speakers with maximum wattage rating of more than 160 watts

(55) **Note:**
1) The lead wires marked "X" are not used. Make sure that they are not in contact with metal.
2) When not using the DIN cord, input to the RCA terminal. In this case, connect the amplifier control lead (blue/white) in the 9-pin connector to the Remote Switching lead from the unit.

■ EXPLODED VIEW • PARTS LIST:


40
52
49
50
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46
55
12
13
52
2
1
14
1
58-1
9
30
28
59-2
43
50
47
10
58-2
19
20
7
9
16
4
44
20
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21
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18
11
58-3
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14
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23
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39
34
25
32
45
15
59-1
26
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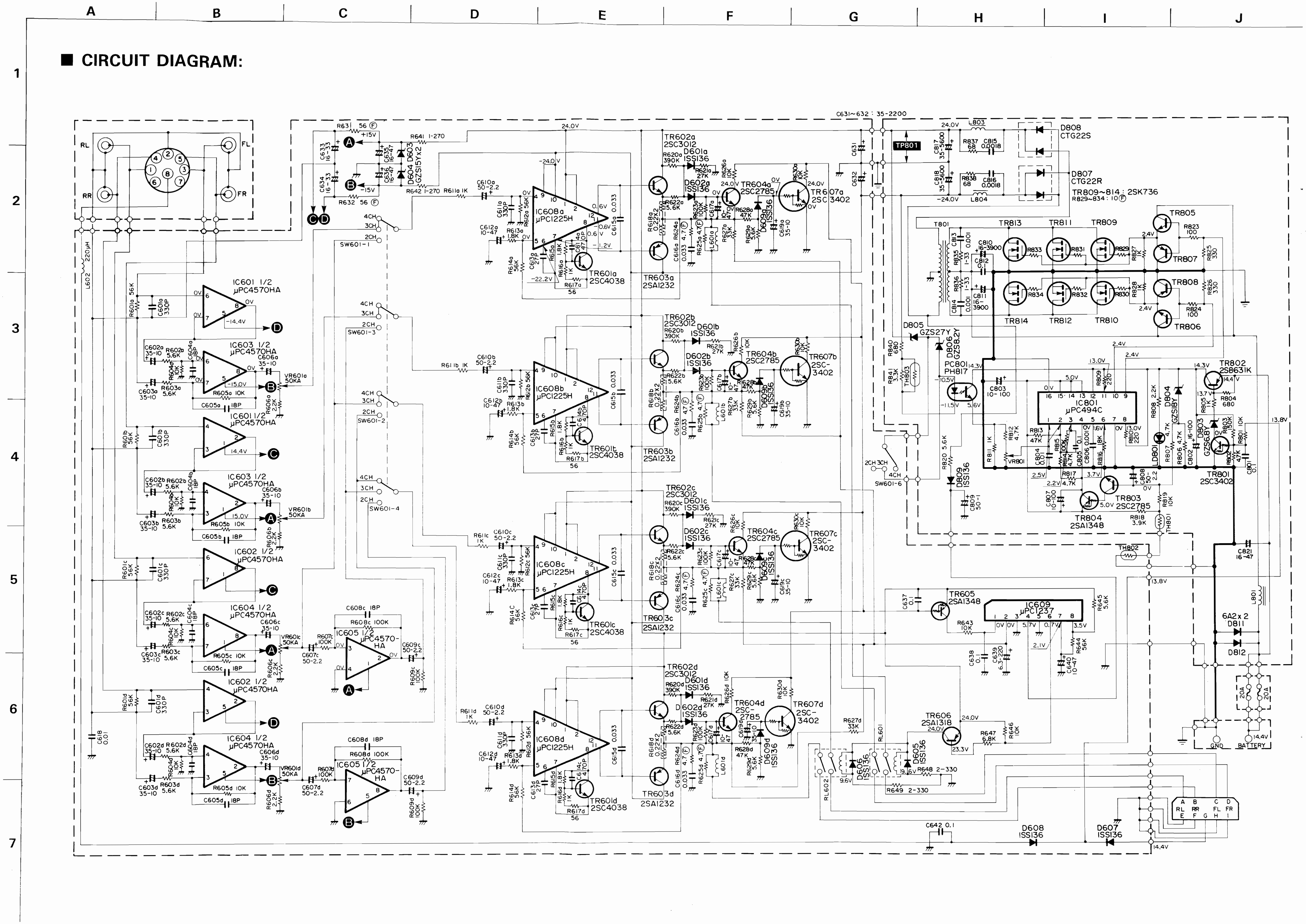
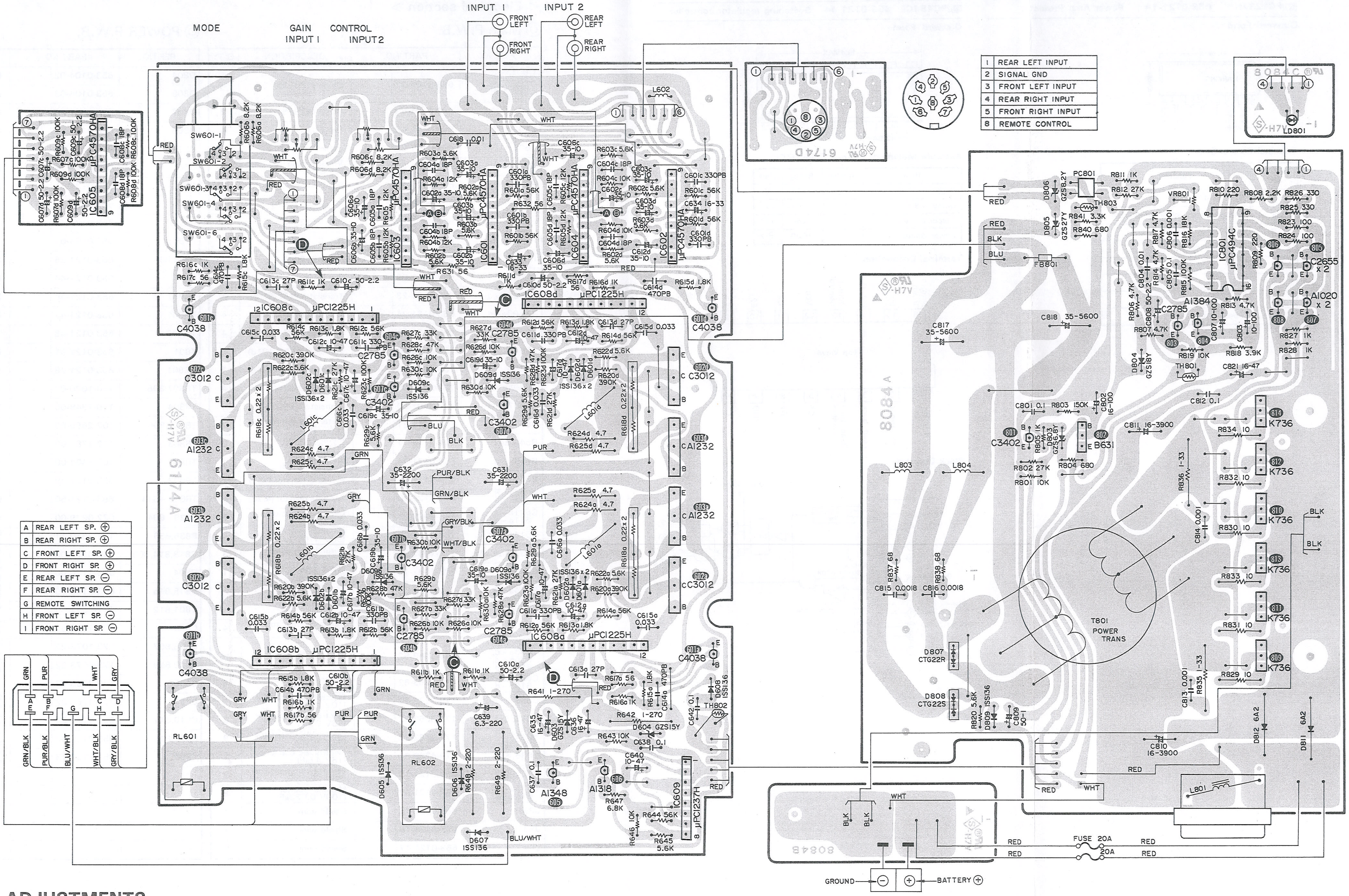
59-3
10
22
10
53
41
48
48
56

Ref. No.	Part No.	Description	Q'ty
1	653-0121-01	Sub heatsink	4
2	653-0121-02	Sub heatsink (C)	2
4	653-0121-04	Rotary switch	1
5	653-0121-05	Pin jack (4P)	1
6	653-0122-01	DIN jack (8P)	1
7	653-0121-77	Sems screw 3×12	8
8	714-3006-81	Machine screw M3×6	1
9	702-3006-81	Tap screw 3×6	5
10	702-3008-81	Tap screw 3×8	15
11	653-0121-06	PCB terminal	1
12	653-0121-07	Cord ass'y (9P)	1
13	653-0121-08	Bracket (connector)	1
14	653-0121-09	Cool sheet	2
15	653-0121-10	Cord ass'y (3P)	1
16	653-0121-11	Cord ass'y (5P)	1
17	653-0121-12	Cord ass'y (2P)	1
18	076-0288-06	6P header	1
19	076-0288-07	7P header	1
20	653-0086-50	IC (μPC 1225H)	4
21	653-0121-25	VR (50KA×2)	2
22	653-0121-26	Sub heatsink (A)	1
23	653-0121-27	Sub heatsink (B)	1
25	735-3010-11	D-sems screw (M3×10)	2
26	653-0121-78	Screw	6
27	653-0121-79	Washer	1
28	653-0121-29	Terminal (BAT/GND)	1
29	653-0121-30	LED holder	1
30	653-0121-31	Cord ass'y (Fuse holder)	1
31	653-0121-32	Cool sheet	1
32	653-0121-33	Cool sheet	1
33	076-0288-04	4P header	1
34	653-0121-35	Connector (5P)	1
35	653-0121-36	Connector (3P)	1
36	653-0121-37	Connector (2P)	1
37	653-0121-50	FET (2SK736)	6
38	653-0121-40	Diode (CTG22R)	1
39	653-0121-41	Diode (CTG22S)	1
40	653-0121-52	Main chassis	1
41	653-0121-53	Bottom plate	1
42	653-0122-02	Front panel	1
43	653-0122-03	Rear panel	1
44	653-0121-56	Knob	1
45	653-0121-57	Choke coil	1
46	060-0057-08	Fuse (20A)	2
47	714-3006-11	Machine screw (M3×6)	2
48	653-0121-80	Flat screw (M3×6)	4
49	653-0121-81	Bind screw (M3×6)	5
50	702-3006-61	Bind screw (M3×6)	8
51	653-0121-82	Bind screw (M3×8)	5
52	653-0121-83	PCB support	2
53	653-0121-58	Insulator	1
54	653-0104-28	LED lens	1
55	653-0121-59	Terminal cover	1
56	653-0122-07	Set plate	1
58	653-0121-66	PCB (MAIN)	1
59	653-0121-72	PCB (POWER)	1

■ CIRCUIT DIAGRAM:


A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
6
7
RL
FL
RR
FR
L602 220μH
C618 0.01
IC601 1/2 μPC4570HA
IC603 1/2 μPC4570HA
IC601 1/2 μPC4570HA
IC603 1/2 μPC4570HA
IC602 1/2 μPC4570HA
IC604 1/2 μPC4570HA
IC602 1/2 μPC4570HA
IC604 1/2 μPC4570HA
IC605 1/2 μPC4570-HA
IC605 1/2 μPC4570-HA
VR601a 50KA
VR601b 50KA
VR601c 50KA
VR601d 50KA
R631 56 Ⓕ
R632 56 Ⓕ
R641 1-270
R642 1-270
+15V
-15V
D603 D604 GZS15Y×2
C633 16-33
C634 16-33
C635 16-47
C636 16-47
SW601-1
SW601-2
SW601-3
SW601-4
SW601-6
4CH
3CH
2CH
24.0V
-24.0V
-22.2V
IC608a μPC1225H
IC608b μPC1225H
IC608c μPC1225H
IC608d μPC1225H
TR601a 2SC4038
TR601b 2SC4038
TR601c 2SC4038
TR601d 2SC4038
TR602a 2SC3012
TR602b 2SC3012
TR602c 2SC3012
TR602d 2SC3012
TR603a 2SA1232
TR603b 2SA1232
TR603c 2SA1232
TR603d 2SA1232
TR604a 2SC2785
TR604b 2SC2785
TR604c 2SC2785
TR604d 2SC-2785
TR607a 2SC3402
TR607b 2SC-3402
TR607c 2SC-3402
TR607d 2SC-3402
D601a 1SS136
D602a 1SS136
D609a 1SS136
C631~632 : 35-2200
TP801
L803
L804
D808 CTG22S
D807 CTG22R
TR809~814 : 2SK736
R829~834 : 10Ⓕ
T801
TR805
TR806
TR807
TR808
TR809
TR810
TR811
TR812
TR813
TR814
D805
D806 GZS8.2Y
GZS27Y
PC801 PH817
TH803
IC801 μPC494C
TR802 2SB631K
TR801 2SC3402
TR803 2SC2785
TR804 2SA1348
D803 GZS6.8Y
D804 GZS18Y
LD801
D809 1SS136
TH801
TH802
C821 16-47
L801
TR605 2SA1348
IC609 μPC1237
TR606 2SA1318
RL601
RL602
D605 1SS136
D606 1SS136
R648 2-330
R649 2-330
C642 0.1
D608 1SS136
D607 1SS136
6A2×2
D811
D812
20A
20A
GND
BATTERY
14.4V
13.8V
A B C D
RL RR FL FR
E F G H I

■ PRINTED WIRING BOARD:


INPUT 1
INPUT 2
FRONT LEFT
FRONT RIGHT
REAR LEFT
REAR RIGHT
MODE
GAIN CONTROL
INPUT 1
INPUT2
SW601-1
SW601-2
SW601-3
SW601-4
SW601-6
IC605 μPC4570HA
IC601 μPC4570HA
IC603 μPC4570HA
IC604 μPC4570HA
IC602 μPC4570HA
IC608a μPC1225H
IC608b μPC1225H
IC608c μPC1225H
IC608d μPC1225H
IC609 μPC1237H
IC801 μPC494C
RL601
RL602
L602
6174 A
6174 D
8084 A
8084 B
8084 C
LD801
PC801
VR801
TH801
TH802
TH803
FB801
T801 POWER TRANS
L801
L803
L804
FUSE 20A
GROUND
BATTERY ⊕
GRN
PUR
BLU
WHT
GRY
RED
BLK
GRN/BLK
PUR/BLK
BLU/WHT
WHT/BLK
GRY/BLK

1	REAR LEFT INPUT
2	SIGNAL GND
3	FRONT LEFT INPUT
4	REAR RIGHT INPUT
5	FRONT RIGHT INPUT
8	REMOTE CONTROL

A	REAR LEFT SP. ⊕
B	REAR RIGHT SP. ⊕
C	FRONT LEFT SP. ⊕
D	FRONT RIGHT SP. ⊕
E	REAR LEFT SP. ⊖
F	REAR RIGHT SP. ⊖
G	REMOTE SWITCHING
H	FRONT LEFT SP. ⊖
I	FRONT RIGHT SP. ⊖

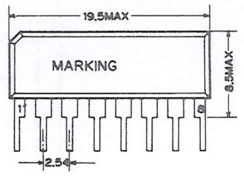
■ ADJUSTMENTS:

1. POWER SUPPLY VOLTAGE:
   Adjust VR801 so that the voltage of TP801 is +24V.

■ EXPLANATION OF IC's:

■μPC1237H 653-0121-14 Power Amp Protector

Outward Form

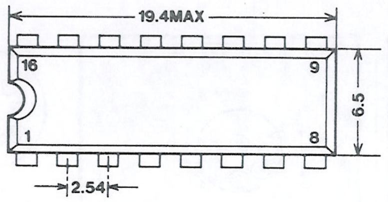

19.5MAX
MARKING
8.5MAX
1
8
2.54

Terminal Connection

Terminal No.	Function
1	Over load detection
2	Central electric potential detection
3	Latch/Auto release selection
4	AC OFF detection
5	GND
6	Relay drive
7	Muting
8	Power supply

■μPC494C 653-0121-44 Switching regulator controller

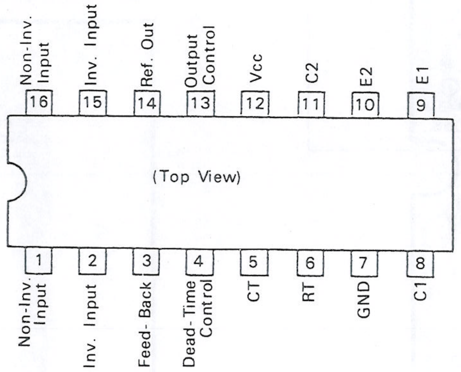
Outward Form


19.4MAX
16
9
1
8
6.5
2.54

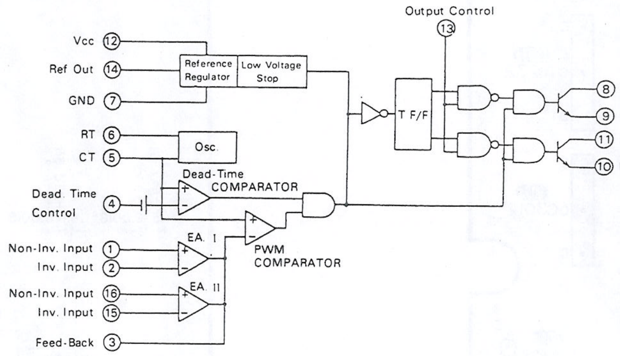
Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit
Supply voltage	V_{CC}	41	V
Output voltage	V_{CER}	41	V
Output current	I_C	250	mA
Power dissipation	P_T	1000	mW

Terminal Connection


Non-Inv. Input
Inv. Input
Ref. Out
Output Control
Vcc
C2
E2
E1
16
15
14
13
12
11
10
9
(Top View)
1
2
3
4
5
6
7
8
Non-Inv. Input
Inv. Input
Feed-Back
Dead-Time Control
CT
RT
GND
C1

Block Diagram


Output Control
13
Vcc 12
Ref Out 14
GND 7
Reference Regulator
Low Voltage Stop
RT 6
CT 5
Osc.
Dead-Time COMPARATOR
Dead Time Control 4
T F/F
8 C1
9 E1
11 C2
10 E2
EA. I
EA. II
PWM COMPARATOR
Non-Inv. Input 1
Inv. Input 2
Non-Inv. Input 16
Inv. Input 15
Feed-Back 3

■ PARTS LIST:

< Electrical section >

◎ Main P.W.B.

REF NO.	PART NO.	DESCRIPTION	Q'TY
D601a~d, 602a~d, 605~608, 609a~d	653-0104-03	Diode (1SS136)	16
D603,604	653-0121-68	Diode (GZS15Y)	2
L601a~d	653-0121-18	Coil (1μH)	4
L602	653-0121-69	Choke coil	1
VR601a,b	653-0121-25	Variable resistor (50KA×2)	2
RL601,602	653-0121-19	Relay	2
IC601~605	653-0086-58	IC (μPC4570HA)	5
IC608a~d	653-0086-50	IC (μPC1225H)	4
IC609	653-0121-14	IC (μPC1237H)	1
IC801	653-0121-44	IC (μPC494C)	1
TH802	653-0121-22	Posister	1
TR602a~d	653-0121-23	Transistor (2SC3012)	4
TR603a~d	653-0121-24	Transistor (2SA1232)	4
TR601a~d	653-0121-71	Transistor (2SC4038)	4
TR606	100-1318-00	Transistor (2SA1318)	1
TR605	100-1348-00	Transistor (2SA1348)	1
TR604a~d	102-2785-00	Transistor (2SC2785)	4
TR607a~d	102-3402-00	Transistor (2SC3402)	4
R648,649	114-2211-21	Metal oxidized resistor (2W 220Ω)	2
R642,641	114-2711-11	Metal oxidized resistor (1W 270Ω)	2
R618a~d	653-0121-20	Plate resistor (5W 0.22Ω×2)	4
R631,632	653-0121-21	Fail-safe resistor (56Ω)	2
R624a~d, 625a~d	653-0121-70	Fail-safe resistor (4.7Ω)	8
C601a~d, 611a~d	160-3312-05	Ceramic capacitor (50V 330pF)	8
C614a~d	160-4712-05	Ceramic capacitor (50V 470pF)	4
C637,638,642	171-1042-06	Ceramic capacitor (25V 0.1μF)	3
C618	173-1032-10	Mylar capacitor (50V 0.01μF)	1
C604a~d, 605a~d, 608c,d	174-1800-43	Ceramic capacitor (50V 18pF SL)	10
C613a~d	174-2700-43	Ceramic capacitor (50V 27pF SL)	4
C602a~d, 603a~d, 606a~d, 619a~d	179-1063-52	Electrolytic capacitor (35V 10μF)	16
C607c,d,609c,d 610a~d	179-2253-62	Electrolytic capacitor (50V 2.2μF)	8
C639	179-2273-22	Electrolytic capacitor (10V 220μF)	1
C633,634	179-3363-32	Electrolytic capacitor (16V 33μF)	2
C612a~d, 617a~d,640	179-4763-22	Electrolytic capacitor (10V 47μF)	9
C635,636	179-4763-32	Electrolytic capacitor (16V 47μF)	2
C631,632	653-0121-13	Electrolytic capacitor (35V 2200μF)	2
C615a~d, 616a~d	653-0121-67	Mylar capacitor (100V 0.033μF)	8
JP5	653-0121-15	Shield wire	1
JP6	653-0121-16	Shield wire	1
JP7	653-0121-17	Shield wire	1

◎ POWER P.W.B.

REF NO.	PART NO.	DESCRIPTION	Q'TY
D804	653-0104-02	Diode (GZS18Y)	1
D809	653-0104-03	Diode (1SS136)	1
D807	653-0121-40	Diode (CTG22R)	1
D808	653-0121-41	Diode (CTG22S)	1
D811,812	653-0121-42	Diode (6A2)	2
D803	653-0121-74	Diode (GZS6.8Y)	1
D805	653-0121-75	Diode (GZS27Y)	1
D806	653-0121-76	Diode (GZS8.2Y)	1
FB801	653-0121-43	Ferrite bead	1
LD801	653-0104-01	LED (Red)	1
L803,804	653-0121-25	Choke coil	2
IC801	653-0121-44	IC (μPC494C)	1
PC801	653-0121-46	Photo coupler	1
TH801	653-0121-47	Posister	1
TH803	653-0121-48	Thermister	1
T801	653-0121-51	Power trans	1
VR801	653-0121-28	Semi-VR	1
TR807,808	100-1020-00	Transistor (2SA1020)	2
TR804	100-1348-00	Transistor (2SA1348)	1
TR805,806	102-2655-00	Transistor (2SC2655)	2
TR803	102-2785-00	Transistor (2SC2785)	1
TR801	102-3402-00	Transistor (2SC3402)	1
TR802	653-0121-49	Transistor (2SB631K)	1
TR809~814	653-0121-50	FET (2SK736)	6
R829~834	032-0039-00	Fail-safe resistor (10Ω)	6
R835,836	114-3310-11	Metal oxidized resistor (1W 33Ω)	2
C813,814,806	043-0171-00	Mylar capacitor (100V 1000pF)	3
C804	043-0175-00	Mylar capacitor (100V 0.01μF)	1
C815,816	043-0193-00	Mylar capacitor (100V 1800pF)	2
C801,812	171-1042-06	Ceramic capacitor (25V 0.1μF)	2
C809	179-1053-62	Electrolytic capacitor (50V 1μF)	1
C803,807	179-1073-22	Electrolytic capacitor (10V 100μF)	2
C802,819	179-1073-32	Electrolytic capacitor (16V 100μF)	2
C808	179-2253-62	Electrolytic capacitor (50V 2.2μF)	1
C821	179-4763-32	Electrolytic capacitor (16V 47μF)	1
C810,811	653-0121-38	Electrolytic capacitor (16V 3900μF)	2
C817,818	653-0121-39	Electrolytic capacitor (35V 5600μF)	2
C805	653-0121-73	Mylar capacitor (100V 0.1μF)	1

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